WHAT IS CLAIMED IS:

1. A peptide construct capable of stimulating an immune response comprising at least one epitope sequence and an antigen presenting cell (APC) targeting mechanism.

2. The construct of claim 1, wherein the immune response is selected from the group consisting of a cytotoxic T cell (CTL) response, a helper T cell response, and a B cell response.

3. The construct of claim 1, wherein the epitope is selected from the group consisting of a CD8+ T cell epitope, a CD4+ T cell epitope, a B cell epitope, and a combination thereof.

4. The construct of claim 1, wherein the epitope is derived from an antigen selected from the group consisting of a tumor-associated antigen (TAA), a viral antigen, a bacterial antigen, a protozoan antigen, and a fungal antigen.

5. The construct of claim 1, wherein the epitope is derived from a tumor-associated antigen (TAA).

6. The construct of claim 5, wherein the tumor-associated antigen (TAA) is carcinoembryonic antigen (CEA).

7. The construct of claim 6, wherein the epitope is selected from the group consisting of YLSGANLNL (SEQ ID NO: 2), HLFGYSWYK (SEQ ID NO: 3) and IPQQHTQVL (SEQ ID NO: 4).

8. The construct of claim 1, wherein the epitope is a non-native epitope, which differs from the native epitope from which this non-native epitope is derived in that it contains at least one alteration in its amino acid sequence.

9. The construct of claim 8, wherein the non-native epitope differs from the native epitope from which this non-native epitope is derived in that it binds with higher affinity to the MHC molecule or to the T cell receptor (TCR), or both.

10. The construct of claim 1 comprising more than one epitope, wherein the epitopes are derived from one or more different antigens.

11. The construct of claim 10, wherein the epitopes are arranged consecutively.

12. The construct of claim 10, wherein at least one epitope is a cytotoxic T cell (CTL) epitope.

13. The construct of claim 1, wherein the epitope is flanked on at least one side by a spacer (flanking) sequence comprising an internal processing sequence.

14. The construct of claim 13, wherein the epitope is flanked on both sides by the spacer (flanking) sequence.

15. The construct of claim 13, wherein the internal processing sequence contains a signal for the endosomal or lysosomal processing of the construct.

16. The construct of claim 13, wherein the internal processing sequence is represented by the formula:
[Leu and/or Asp and/or Pro]-[Xaa-Lys-Xaa-Lys-$Y_{T/C}$],
wherein each Xaa is independently selected from any amino acid, and $Y_{T/C}$ is an amino acid that is susceptible to cleavage by trypsin or chymotrypsin.

17. The construct of claim 13, wherein the internal processing sequence is represented by the formula:

[Leu-Xaa-Xaa-Asp-Xaa-Xaa-Pro]-[Xaa-Lys-Xaa-Lys-Phe],
wherein each Xaa is independently selected from any amino acid.

18. The construct of claim 1, wherein the antigen presenting cell (APC) targeting mechanism comprises an APC targeting sequence, which directs the construct to the antigen presenting cells (APCs).

19. The construct of claim 18, wherein the antigen presenting cell (APC) targeting sequence is covalently attached to the epitope-containing sequence.

20. The construct of claim 18, wherein the antigen presenting cell (APC) targeting sequence is derived from a sequences capable of mediating interaction with a cell surface protein selected from the group consisting of CD91, Mannose Receptor (MR), DEC-205, DC-SIGN, and FcγRI.

21. The construct of claim 18, wherein the antigen presenting cell (APC) targeting mechanism further comprises a vehicle that performs at least one of the following functions:

(i) mediates APC targeting;
(ii) preserves the viability of the construct until it has reached its intended APC,
(iii) mediates a controlled release of the construct.

22. The construct of claim 21, wherein the vehicle is a microsphere or a liposome.

23. An isolated nucleic acid encoding the construct of claim 1.

24. An expression vector comprising the nucleic acid of claim 23.

25. The expression vector of claim 24, further comprising an APC targeting

mechanism.

26. A host cell comprising the nucleic acid of claim 23.

27. The host cell of claim 26 which is an APC.

28. A pharmaceutical composition comprising an immunogenically effective amount of the construct of claim 1.

29. The pharmaceutical composition of claim 28 further comprising a pharmaceutically acceptable adjuvant or excipient.

30. A vaccine composition comprising an immunogenically effective amount of the construct of claim 1.

31. The vaccine composition of claim 30 further comprising a pharmaceutically acceptable adjuvant or excipient.

32. A method for generating an immune response against an antigen in a mammal, which method comprises administering to the mammal at least one dose of the pharmaceutical composition of claim 28.

33. The method of claim 32, wherein the antigen is a tumor-associated antigen (TAA).

34. The method of claim 33, wherein administering the pharmaceutical composition of claim 28 induces an antigen-specific cytotoxic T cell (CTL) immune response.

35. A method for augmenting immunity induced by an antigen in a mammal comprising administering to said mammal the pharmaceutical composition of claim 28.

36. A method for treating a disease in a mammal comprising administering to said mammal at least one dose of the pharmaceutical composition of claim 28.

37. The method of claim 36, wherein the disease is selected from the group consisting of neoplastic diseases, infections and autoimmune diseases.

38. The method of claim 36, wherein the disease is cancer.

39. A method for treating a tumor in a mammal comprising administering to said mammal at least one dose of a pharmaceutical composition comprising an immunogenically effective amount of a construct capable of stimulating an anti-tumor immune response, which construct comprises at least one epitope sequence derived from a tumor-associated antigen (TAA) and an antigen presenting cell (APC) targeting mechanism.

40. The method of claim 39, wherein the epitope in the construct is selected from the group consisting of a CD8+ T cell epitope, a CD4+ T cell epitope, a B cell epitope, and a combination thereof.

41. The method of claim 39, wherein the tumor-associated antigen (TAA) is a carcinoembryonic antigen (CEA).

42. The method of claim 41, wherein the epitope in the construct is selected from the group consisting of YLSGANLNL (SEQ ID NO: 2), HLFGYSWYK (SEQ ID NO: 3) and IPQQHTQVL (SEQ ID NO: 4).

43. The method of claim 39, wherein the epitope in the construct is a non-native epitope, which differs from the native epitope from which this non-native epitope is derived in that it (i) contains alterations in its amino acid sequence and (ii) binds with higher affinity to the MHC molecule or to the T cell receptor (TCR), and is useful for

modulating immune response to the native epitope from which this non-native epitope is derived.

44. The method of claim 39, wherein the construct comprises more than one epitope, wherein the epitopes are derived from one or more different tumor-associated antigens (TAAs).

45. The method of claim 44, wherein the epitopes in the construct are arranged consecutively.

46. The method of claim 44, wherein at least one epitope in the construct is a cytotoxic T cell (CTL) epitope.

47. The method of claim 39, wherein the epitope in the construct is flanked on at least one side by a spacer (flanking) sequence comprising an internal processing sequence.

48. The method of claim 47, wherein the epitope is flanked on both sides by the spacer (flanking) sequence.

49. The method of claim 47, wherein the internal processing sequence contains a signal for the endosomal or lysosomal processing of the construct.

50. The method of claim 39, wherein the antigen presenting cell (APC) targeting mechanism comprises an APC targeting sequence, which directs the construct to the antigen presenting cells (APCs).

51. The method of claim 50, wherein the antigen presenting cell (APC) targeting sequence is covalently attached to the epitope-containing sequence.

52. The method of claim 50, wherein the antigen presenting cell (APC)

targeting sequence is derived from a sequences capable of mediating interaction with a cell surface protein selected from the group consisting of CD91, Mannose Receptor (MR), DEC-205, DC-SIGN, and FcγRI.

53. The method of claim 50, wherein the antigen presenting cell (APC) targeting mechanism further comprises a vehicle that performs at least one of the following functions:

(i) mediates APC targeting;

(ii) preserves the viability of the construct until it has reached its intended APC,

(iii) mediates a controlled release of the construct.

54. The method of claim 53, wherein the vehicle is a microsphere or a liposome.